What is claimed is:

1. A method for detecting a roll rate sensor fault comprising:

generating a reference roll angle;

generating a roll rate sensor signal;

comparing said reference roll angle to said roll rate sensor signal; and

generating a roll rate sensor fault signal in response to comparing said reference roll angle to said roll rate sensor signal.

2. A method as recited in claim 1 further comprising compensating for a valid signal bias in said roll rate sensor signal.

3. A method as recited in claim 2, wherein compensating for a valid signal bias further comprises adjusting an electrical long term bias over time with a minute adjustment at each sampling time or a sliding mode control.

4. A method as recited in claim 2, wherein compensating for a valid signal bias further comprises adjusting a mechanical long term sensor alignment pitch angle with a minute adjustment at each sampling time during vehicle turning or a sliding mode control during vehicle turning.

5. A method as recited in claim 2, wherein compensating for a valid signal bias further comprises halting roll rate sensor signal compensation in response to a fault flag or in response to a situation where compensation is unnecessary.

6. A method as recited in claim 1, wherein generating said reference roll angle further comprises sensing at least one of lateral acceleration, yaw rate, vehicle longitudinal speed, vehicle roll angle, wheel speed, or a GPS.

7. A method as recited in claim 1 further comprising refining said reference roll angle through steering wheel angle information to reduce a negligence error of a lateral velocity derivative.

8. A method as recited in claim 1 further comprising refining said reference roll angle with a calculation of a dynamic relation between a vehicle lateral acceleration and a suspension roll motion.

9. A method as recited in claim 1, wherein comparing said reference roll angle to said roll rate sensor signal comprises comparing a low pass filter version of a derivative of said reference roll angle with said roll rate sensor signal.

10. A method as recited in claim 1, wherein comparing said reference roll angle to said roll rate sensor signal comprises comparing a high pass filtered reference roll angle with a high pass filtered version of an integration of said roll rate sensor signal.

11. A method as recited in claim 1, wherein comparing said reference roll angle to said roll rate sensor signal comprises comparing said reference roll angle and said roll rate sensor signal through building a filter utilizing both a suspension dynamics and a kinematics relationship between roll angle and roll rate.

12. A method as recited in claim 1, wherein comparing said reference roll angle to said roll rate sensor signal comprises comparing said reference roll angle to said roll rate sensor signal through an observer that utilizes a kinematics relation and a dynamics relation.

13. A method as recited in claim 1, wherein comparing said reference roll angle to said roll rate sensor signal further comprises utilizing generating a dynamic bias estimate with a logic having said vehicle roll rate signal averaging to zero over a long period of time.

14. A method as recited in claim 1, wherein generating said roll rate sensor fault signal further comprises generating a lateral acceleration signal;

filtering said lateral acceleration signal;

generating a filtered lateral acceleration signal;

high pass filtering said roll rate sensor signal;

generating a filtered roll rate sensor signal; and

comparing said filtered lateral acceleration signal to said filtered roll rate sensor signal.

15. A method as recited in claim 1 further comprising shutting down a safety system in response to roll rate sensor fault or error.

16. A method as recited in claim 1 further comprising generating a substitute signal for said roll rate signal in response to roll rate sensor

fault.

17. A method for detecting a roll rate sensor fault comprising:

generating a reference roll angle in an inertial frame with available signals other than roll rate;

generating a roll rate sensor signal;

compensating said roll rate sensor signal for all valid signal biases;

comparing said reference roll angle to said roll rate sensor signal through a kinematics relation and a dynamic interaction related by a vehicle suspension; and

generating a roll rate sensor fault signal comparing said reference roll angle to said roll rate sensor signal.

18. A method as recited in claim 17, wherein compensating for a valid signal bias further comprises halting roll rate sensor signal compensation in response to a fault flag or in response to a situation where compensation is unnecessary.

19. A method as recited in claim 17, wherein generating said roll rate sensor fault signal further comprises generating a lateral acceleration signal;

filtering said lateral acceleration signal;

generating a filtered lateral acceleration signal;

high pass filtering said roll rate sensor signal;

generating a filtered roll rate sensor signal; and

comparing said filtered lateral acceleration signal to said filtered roll rate sensor signal.

20. A method as recited in claim 17 further comprising refining said reference roll angle with a calculation of a dynamic relation between a vehicle lateral acceleration and a suspension roll motion.

21. A control system for an automotive vehicle having a vehicle body comprising:

a sensor cluster having a housing oriented within the vehicle body;

a roll rate sensor positioned within the housing adapted to generate a roll rate sensor signal corresponding to an roll angular motion of the sensor housing; and

a controller adapted to receive said roll rate sensor signal, said controller further adapted to generate a reference roll angle, and compare said reference roll angle to said roll rate sensor signal, said controller further adapted to generate a roll rate sensor fault signal in response to a fault determined in said roll rate sensor.

22. A system as recited in claim 21, wherein said controller is further adapted to compensate said roll rate sensor signal for all valid signal biases.

23. A system as recited in claim 21, wherein said controller is further adapted to refine said reference roll angle through steering wheel angle information.

24. A system as recited in claim 21,

wherein said controller is further adapted to shut down a roll over detection system in response to said roll rate sensor fault signal.

25. A system as recited in claim 21, wherein said controller is further adapted to generate a substitute roll rate signal from sensor signals from at least one of a lateral accelerometer, a longitudinal accelerometer, a vertical accelerometer, a yaw rate sensor, a pitch rate sensor, a wheel speed sensor, a steering angle sensor (hand-wheel sensor), or a steering angle position sensor (road-wheel sensors).

26. A method for detecting a vehicle-dynamic sensor fault comprising:

generating a reference vehicle-dynamic sensor signal;

generating a vehicle-dynamic sensor signal; and

compensating for a valid signal bias in said vehicle-dynamic sensor signal by adjusting a mechanical long term sensor alignment angle with a minute adjustment at each sampling time during a vehicle operation.

27. The method of claim 26 further comprising comparing said reference vehicle-dynamic sensor signal to said vehicle-dynamic sensor signal.

28. The method of claim 27 further comprising generating a sensor fault signal.